CONSERVATION CURRICULUM

Reminder

Missouri Department of Conservation 2003-2004 Outdoor Classroom Grant application deadline is April 4, 2003. If you have questions, contact Syd Hime at 573/751-4115, x 3370

Warehouse Clearance

Conservation is clearing out the warehouse! We are overstocked on several publications and we'd like to offer them to you. If you would like to get free copies of any of these, clip the form below and send to Distribution Center, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102-0180, call 573/751-3630 or fax 573/522-2020.

_____ **Mizzou Magic (E00097)**. A wealth of information to celebrate Lewis and Clark. Take a close look at their historic journey - from the boats they sailed, to the maps they made, to the foods they ate.

_____ **Conservation for Kids (E00067)**. A four page activity booklet containing a word search, an "interactive" stream story, favorite Missouri symbols and instructions for making a few simple "nature-watching" tools.

_____**Conservation for Family & Consumer Sciences (E00034)**. An instructional unit designed to help middle through high school teachers integrate conservation concepts into their family and consumer sciences curriculum.

_____ **Conservation I Can Do (E00025)**. Activity guide of projects for young children that can be done at home. Create forest and cave panoramas; make a water viewer; discover owl pellets.

_____ **Kids Fishing Book (E00092)**. Fun-filled activity book designed to make students more aware of the need for clean water, how and where fish live and to teach responsible fishing.

_____ **Owls Booklet (E00455)**. A full-size fold out brochure of Missouri's owls with color pictures and descriptions.

_____ **Wildflower Favorites (E00444)**. An eight-page color booklet featuring 12 of the most popular native wildflowers now being used in landscaping projects.

_____ **Common Roadside Wildflowers (E00451)**. Handy color brochure highlighting over 18 species of wildflowers found on Missouri's roadsides.

Name_____

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School Shipping Address (UPS will not deliver to a PO Box number)

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Conservation Careers

GIS Specialist

A Geographic Information System (GIS) helps a person manipulate, analyze and present information tied to a geographic location. This information can include roads and streams which are viewed on the computer instead of on paper. How does this technology fit into the world of conservation? Simply, it is used to help manage fish, forest and wildlife resources. For example, a GIS Specialist who works for the Department of Conservation directs the design and development of aquatic GIS applications, such as a habitat classification system for streams and rivers. GIS systems can be used to analyze pollution damage such as oil spills or to monitor and model other aspects of the environment. The specialist researches the latest GIS products, distributes them to resource managers and administrators, and provides technical assistance and training to the users. A GIS Specialist may be asked to review proposed projects and make recommendations for solutions and alternatives and then customize the GIS programs and applications to fit the Department's needs. Effective use of GIS technology allows the Department to manage Missouri's natural resources more efficiently.

GIS Specialists with the Missouri Department of Conservation have graduated from an accredited college or university with a Master's degree in Geography, Natural Resource Sciences or a closely related field and have had at least three years of professional experience in planning, designing and implementing GIS projects.

Bulletin Board Butterfly Habitat Garden

PreK-2

Developed by: Barb Byrne
Outreach & Education, Missouri Department of Conservation

Materials

- Books about butterflies and gardening for butterflies
- Brochure E00471 – "Butterfly Gardening and Conservation" available from Missouri Department of Conservation
- Background paper
- Green construction paper
- Garden magazines
- Paper cutouts of grass, flowers, butterflies, caterpillars, worms, snakes, ants, ladybugs, etc.
- Glue/paste
- Scissors

Preparation

- Read books about butterflies.
- Talk about caterpillars and their metamorphosis into butterflies.
- Show pictures of the various life cycle stages from caterpillar to butterfly.
- Discuss what makes up a habitat for butterflies.

Procedure

1. Cover the bulletin board with background paper.
2. Have the students identify the prepared grass cutouts.
3. Guide each student through pasting strips of "grass" on the board.
4. Have the students find pictures of flowers in the magazines and cut them out.
5. Guide each student through pasting his/her flowers on the board.
6. Have the students identify pictures or cutouts of the other creatures that might be a part of the butterfly garden.
7. Guide students through pasting the pictures or cutouts in appropriate places on the board.
8. After the bulletin board is complete, discuss how the garden will operate.

Questions for Discussion

1. Where will the butterflies get water?
2. Why is the sun important to the butterfly garden?
3. What can we do to help the butterfly garden?

Supplementary Activities

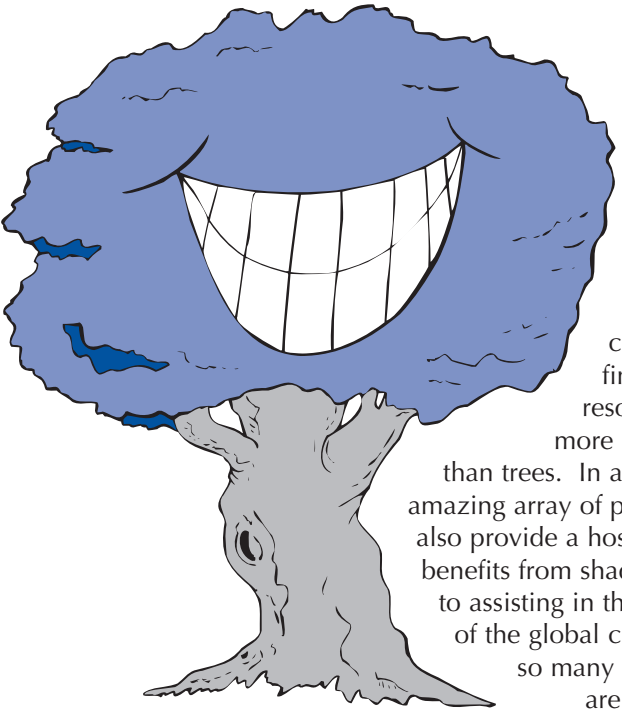
Art – Provide materials for the children to draw and color pictures of butterflies and gardens during self-selected activity time.

Outside – Look for butterflies in the playground area during self-selected activity time.

Outside – Choose species of flowers that attract butterflies and plant them in an outside container that children can observe from a classroom window.

Science – Provide samples of live plants that would be good choices for a butterfly garden. Children can describe the colors and textures of the plants and identify the parts.

Writing – Provide paper, pencils and crayons for children to write stories about butterflies and gardens. Allow the children to spend as much or as little time as they wish on this activity. Take their dictation as they finish their work. Bind the pictures and stories together to create a class book about butterfly gardening.



Tree-ific Trees

3-4

It would be challenging to find a natural resource that has more diverse uses than trees. In addition to an amazing array of products, trees also provide a host of other benefits from shading our yards to assisting in the maintenance of the global climate. With so many benefits, trees are deserving of some action to recognize their importance. Students can express their appreciation of trees by carrying out any of the following activities.

Arbor Day Party

Strike up the band, invite the community and turn April 4th into a fun, festive Arbor Day party at your school.

- Dedicate a forest, a tree, or a flowerbed in a park, and make it an occasion to talk about stewardship.
- Raise money through a recycling drive to purchase trees for the school or community.
- Have a ground breaking ceremony for a new outdoor classroom.
- Fill the air with music. Have an Arbor Day concert of songs about trees or with tree names in their titles.
- Organize a poster or poetry contest.
- Create a pageant or play depicting the importance of trees.
- Make edible treats from tree products.
- Adopt-A-Tree on school grounds or in your community. Start a journal to record changes in your adopted tree throughout the year.

Plant A Tree

1. Ask students to name areas in the community where trees have been planted. In small groups have them list the benefits trees provide to people and wildlife in those areas. Combine the groups' lists to develop a class list, and add other benefits the class can think of.
2. Have students work in small groups to identify areas in the community or on the school grounds that would be improved by the presence of one or more trees. Have them refer to the list of tree benefits as they consider different planting sites.
3. After students have identified possible sites, have a group discussion about the feasibility of each site. Develop a system for prioritizing which site (or sites) should be the focus of their tree planting campaign.
4. Assign teams to research the questions listed under **Trees in Your Community**.
5. After students have the answers to their questions, have them formulate plans for carrying out their action project. For instance, they may want to organize a fund raiser to help purchase trees or they may want to develop a tree adoption program with local businesses and citizens donating trees.
6. Designate a tree planting day or week and have student's plant trees in their selected sites. Make sure the students, or other responsible designee, will take care of the newly planted trees.

Trees in Your Community

From: Arbor Week Activity Guide, Missouri Department of Conservation

Contact your local government offices (city hall, county courthouse, etc.) to arrange for a guest speaker to visit your school or for your class to take a fieldtrip to visit them. Have students ask the official their own questions and learn the answers to these questions:

1. What department is in charge of the trees in the community?
2. How much money does this department spend each year on tree care?
3. What are the main expenses?
4. Has the community planted any trees? Where do they get their planting stock?
5. How do they decide what species of trees to select for planting?
6. How many of the trees that they planted survived?
7. What are the biggest enemies to trees in our community?
8. What can people do to help our trees stay healthy?
9. Does our community do anything to celebrate Arbor Day?

A Peek At Packaging

From: Project Learning Tree

5-8 OUTSIDEin Guide

Objectives

After completing this activity, students will be able to:

- Describe the different purposes for packaging
- Identify the pros and cons of different types of packaging
- Explore how packaging affects our decisions as consumers

Show Me Standards

Performance: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10
2.1, 2.3, 2.4, 2.5
3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
4.1, 4.6, 4.7

Knowledge: CA1, 4, 6; FA1, 4; HP3, 6; S1, 7, 8; SS4, 7

Materials

- Samples of different kinds of packaging
- Copies of "Consumer Choices" Copy Page
- A variety of common products students brought from home, such as household cleaners, cosmetics, foods, toys, shampoo, etc.

Overview

Nearly everything we buy comes in some sort of package. Packaging, made from a variety of renewable and nonrenewable resources, is necessary to protect an item, keep it fresh, make it tamper-proof, and make the item easy to transport and store. In this activity, students will examine the pros and cons of different packaging strategies.

Background

At the most basic level, packaging is needed to hold items together in the size or amount desired for purchase. The concept behind product packaging has evolved over time, changing to fit the needs or demands of consumers as much as to fit the economic demands on manufacturers. The earliest forms of packaging employed animal skins, earthenware vessels and woven baskets. Glass bottles, fired clay amphorae and finished leather were developed between 2,500 and 3,500 years ago. Packaging as we know it in the late 20th century is relatively new, having had its start with the advent of economically efficient packaging machinery in the latter part of the 19th century.

The very nature of the products we consume dictates the kind of materials used in the packaging process. Canning certain food items and other perishables assures maximum shelf-life and freshness; paper milk cartons or plastic jugs allow for easy pouring and storage; plastic boxes with shrink-wrap packaging for items like compact discs allow for maximum display in a minimum amount of space; large cardboard boxes of laundry detergent help consumers purchase in bulk items that will be used often. In many instances packaging prevents contamination and provides tamper-proof protection for the consumer. Packaging also provides a convenient surface for displaying important consumer information as well as advertising space for the manufacturer.

Manufacturers and consumers have become more aware of the impact of packaging on the environment, as well as the conservation of natural resources, energy, and waste management.

Some companies are changing the materials used in their packaging; others have reduced, or even eliminated packaging of some products; still others are increasing the amount of recycled material used to make their packaging.

In many instances, the need for packaging, and the kind of materials used in packaging, is self-evident. Sometimes, however, it may be difficult to understand why a certain package has been used. Students should be prepared to ask informed questions about packaging and make responsible purchasing decisions based on an analysis of the information. The following activity will help them compare packaging practices and choose wisely the kind of products and their packages that best suit their needs as consumers.

Getting Ready

- Bring in examples of different kinds of packaging used for different purposes, such as advertising, freshness, tamper prevention, and convenience.
- Make copies of the "Consumer Choices" Copy Page for each team.

Part A - Taking a Closer Look

1. Set out the examples of packaging that you brought in. Discuss each package and the product it contains (or contained) with the entire group. Use the questions on the "Consumer Choices" Copy Page.
2. Ask students why they think each product is packaged the way it is. (cost, ease in shipment,

public health, protection from damage) Ask them what the pros and cons are of each package in terms of protection, bulkiness, tamper resistance, recycled materials and so forth.

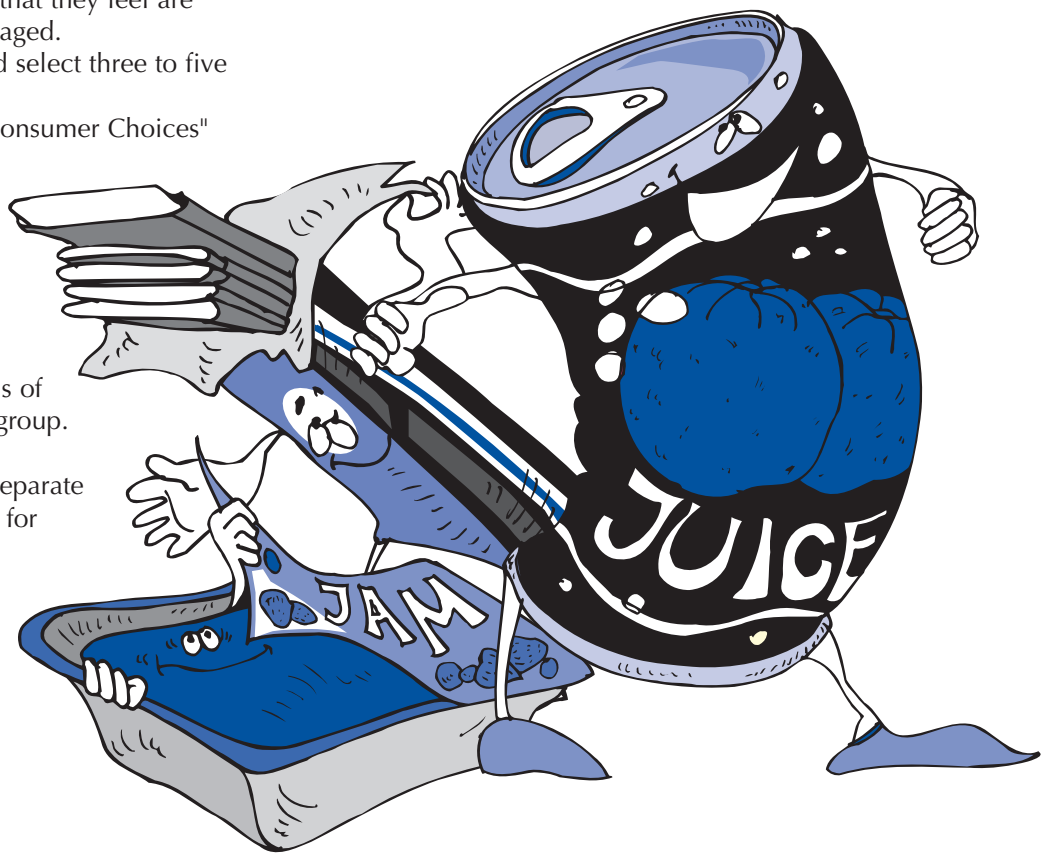
Part B - Pick a Product

1. Ask students to bring in two packages that they feel are properly packaged, and two that they feel are improperly or insufficiently packaged.
2. Have students work in teams and select three to five items to evaluate.
3. Give each team a copy of the "Consumer Choices" Copy Page for each item they will evaluate. Have students work together to complete the questions. Point out how to tell whether a product is made from recycled material. (Look for recycled sign.)
4. Have each team share its analysis of one product with the rest of the group.

You might suggest that team members separate their examples into two categories, one for packaging they think could be improved and one for packaging that seems fine the way it is.

Assessment Opportunity

Have students create an ideal package out of art materials or recycled home and school items for one of the products they evaluated. Then have them make a presentation on why their package suits their product. Evaluate the proposed package.



Outside In

Did you know that many of our insects are action-oriented recyclers? Some varieties of wasp build paper combs beneath eaves and overhangs, whereas hornets and yellow jackets build tiers of combs enclosed with a tough paper covering and hung in a tree. These insects get their paper by chewing up – "recycling" – weathered and rotting wood, dead stems, bark or man-made paper and cardboard and mixing it with saliva to make a pulpy mass. They can shape it to any form and it dries into a very tough "paper" nest.

Other wasp species are "reducers." For example, the Velvet Ant looks for bee larvae and lays one egg next to each developing bee. When the ant eggs hatch, they eat the bee larvae. Cicada Killers, another wasp species, wander outdoors during the summer, looking for cicadas to paralyze with their stinger and take back to their nests to feed their young. Although these practices may sound negative, in reality, these reducers help keep our insect populations in balance.

CONSUMER CHOICES

OBSERVE your product closely. DISCUSS the following questions with your team.
ANSWER the questions as best you can, using your team's knowledge and the information given on your product.

_____
PRODUCT NAME

_____ _____
TYPE OF PRODUCT SHIPPING DISTANCE

_____ _____
LOCATION OF PRODUCER NET WEIGHT OF CONTENTS

1. Describe all parts of the packaging.

2. Is the amount or type of packaging influenced by the manufacturer's need (e.g., federal labeling regulations) or desire to include product information and labeling?

3. What materials make up the packaging? (How much of it is paper? Plastic? Glass? Metal? Other?)

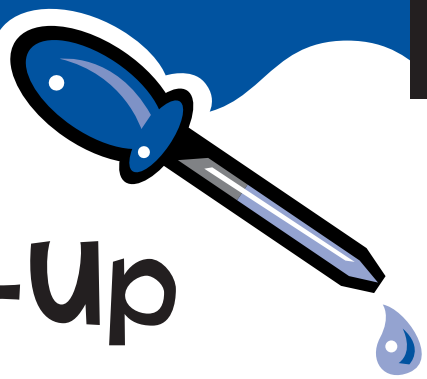
4. Is the product made of recycled material? Is the packaging?

5. Is the product biodegradable and/or recyclable? Is the packaging?

6. What purpose does each piece of packaging serve? (portion size, health, safety, freshness, anti-theft, advertising, other reasons) You may give several answers.

7. After the product has been used, what is thrown away?

8. Can you think of a better or different way to package the product?



9-12 Water Clean-Up

Adapted from: "Streets to Streams: Youth Investigations into Water Quality," Missouri Department of Conservation

Objectives

In this activity, students will:

- Visualize the process through which water becomes contaminated and partially cleansed
- Discover how difficult it is to remove contaminants from water

Show Me Standards

Performance: 1.3, 1.6, 1.8, 2.1, 2.3, 3.2, 3.3, 4.1, 4.6, 4.7

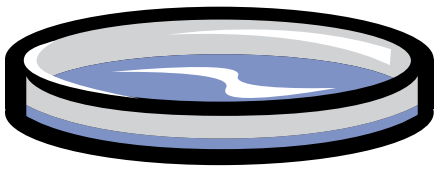
Knowledge: CA1, 6; HP6; S7, 8

Materials

- 1 liter or quart jar containing 2 cups (1/2 liter) clean tap water
- 1liter or quart jar of water contaminated with:
  - ✓ 3 tablespoons (45 ml) dark vegetable oil (simulates motor oil)
  - ✓ 2 tablespoons (30 ml) leaf litter or compost (sewage)
  - ✓ 1 teaspoon (5 ml) sand/mud (erosion)
  - ✓ 5 drops dish detergent (soaps)
  - ✓ 3 drops food coloring (hazardous waste)
  - ✓ 1 tablespoon (15 ml) garbage (garbage)
- washbasin containing the following:
  - ✓ 2 coffee filters
  - ✓ 1 six-inch square of fine screen
  - ✓ 1 eye dropper
  - ✓ 1 spoon
  - ✓ 3/4 cup (175 ml) clean sand
  - ✓ 1 medium size funnel
  - ✓ 1 sponge
  - ✓ 2 clear jars to hold "cleaned" water
  - ✓ empty container (yogurt cups) to hold removed contaminants
  - ✓ paper towels for messes

Preparation

- Before class, prepare contaminated water for each small group, reserving one container to prepare before students as a demonstration.
- Prepare a master list of contaminants on an overhead or flipchart that includes the following substances: yard wastes, cigarette butts, paint, pet wastes, motor oil, antifreeze, food and cleansers.



Procedure

1. Organize the students into small groups. Ask each group to brainstorm a list of substances that might contaminate water.
2. Have the students share their lists with the class. Then compare their lists to the master list you prepared before class.
3. Prepare to contaminate one water sample in front of them. As you go over each type on the master list, add a representative contaminant to the water sample.
4. Distribute materials to each group.
5. Tell students to clean up their own sample of contaminated water providing the following guidelines:
   - 20 minutes to restore the contaminated water to its original clean drinkable state.
   - Pour all liquids over the wash basin to contain spills.
   - Everyone on the team must have a chance to help clean the water.
   - Before cleanup begins, teams must write their cleanup steps on a blank sheet and show teacher.
   - Use only the supplies in the wash basin at the work station.
   - Discuss with your team what equipment will work best for cleaning each contaminant. Write the order in which you plan to use the equipment.
   - When done, place a sample of the cleaned water in a clear jar to show the class. Place any waste removed from the contaminated water in the empty container.
   - Team will report to the class successes and difficulties encountered.
6. If necessary, guide students in brainstorming ways they might use the materials provided to cleanse their water. Review each group's plan and do not attempt to direct their procedure beyond encouraging them to try all the equipment. They will learn from their successes or failures.
7. After all groups have completed their clean up and reported their results to the class, ask the following questions to stimulate discussion. These are opinion questions, so there are no wrong answers:

- What methods worked best to clean the water?
- Which contaminants were hardest to remove?
- Which were easiest?
- Were you able to remove everything?
- If not, why not?
- What equipment or supplies do you wish you had?
- Only three drops of food coloring were added, yet the color was hard to remove. What does this tell you about hazardous substances in the environment?
- Did any of the groups try to dilute their sample? Did it get rid of the color?

8. Ask students:
   - Do all household hazardous products have safer alternatives? (No.)
   - What is the best approach in this case? (Buy only the quantity needed, use and store safely, recycle if possible or dispose of properly.)

Moving From Awareness to Action – Making an Action Plan

1. Lead your class in a brainstorming activity about how they can prevent water contamination. (Some areas to cover include trash, cars, gardens, pets, recycling and disposal.)
2. Write the ideas on a board or flipchart. As a class or homework assignment, have the students develop their own personal action plan containing the following points: my goal in reducing water contamination; date by which I will do this; obstacles to achieving my goal; what I'm apprehensive about; my strengths in this effort; from whom/where I could get support; what I need more information about; how I will know I have reached my goal.
3. Lead a class discussion of their plans, creating a master table on the board or flipchart, listing goals, obstacles and strengths.
4. Call attention to the combined strengths and then brainstorm ways to overcome the identified obstacles.

Extended Learning

1. Have students research and develop guided imagery narratives that follow water through industrial, pristine, natural and agricultural settings.
2. Have students create an expression (artwork, poem, rap, skit, song or video) demonstrating the similarities and differences between the processes they tried in the lab and the way wastewater from their homes is treated (septic tank or municipal treatment plant).
3. Have students get their parents' help to inventory products in their own home, reading labels and indicating which might threaten stream life if they went down a storm drain.
4. Have students investigate and demonstrate safer cleaning alternatives for common household cleaning products including baking soda, salt, vinegar, lemon juice, etc.